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BIODIVERSITY

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INVASIVE SPECIES POSE THREAT TO GLOBAL BIODIVERSITY

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As attention has been riveted on habitat destruction and consequent losses in species and on the looming threat of climate warming, a phenomenon that is changing the biological face of the Earth largely has been overlooked. Somehow, one of the major environmental issues of recent time has slipped between the cracks.

It is not as if fair warning has not been provided. Charles Elton, in his classic book published in 1958 on *The Ecology of Invasions by Animals and Plants* concluded that, "we must make no mistake: we are seeing one of the great historical convulsions in the world's fauna and flora". In Chris Bright's recent book, *Life Out of Bounds*, he carefully documents what he calls the "silent uproar of biotic mixing (that) is damaging both worlds that people inhabit: the natural and the social". Invasive species are so pervasive that some biologists are calling the era in which we now live, tongue in cheek, the Homogocene (for its homogenization).

Why this concern and what has caused it? Essentially the natural biogeographic barriers that have existed through geological time, principally the oceans, have been breached by commerce. The presence of these barriers resulted in the earth's current evolutionary separation and biotic richness. The recent increase in the globalization of trade has battered down these biogeographic barriers even further, with a resultant flood of new biotic material being exchanged among continents.

Some of this new material is of great value to society and is the foundation of worldwide agricultural systems. However, large numbers of species have come in unbidden to the United States, including the zebra mussel, purple loosestrife, cheatgrass, to name only a few. Many of these introduced organisms, including those brought in purposely, do enormous damage to the ecosystems upon which humans depend.

Stories of invasive species are newspaper favorites. These include tales about the invasion of a frog here, or a fish

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introduction there, but somehow this sporadic and isolated information does not give us a sense of the magnitude of the problem and the enormous economic and biological damage that is being wrought by invasive species. However, occasionally articles give an indication of the large scale effects of invasives, such as one published recently with the headline, "Flowers running amok in African lake; Water hyacinths strangle docks, choke pump stations, clog waterways and disrupt lives of millions in Uganda, Kenya, Tanzania".

There is a large set of reasons for concern. First, invasive species represent the second greatest threat to biodiversity, following habitat destruction. However in many areas, particularly on islands, invasives are the single greatest threat. Even in California, which has one of the highest numbers of endangered species in the country, the numbers of introduced species outnumber the endangered ones by over ten-fold. Over twenty percent of the plant species are relative newcomers to this biologically unique area; in Hawaii the number is over 40 percent. Many of these introductions occupy vast areas, such as the star thistle in California and cheat grass in the Great Basin.

Many invasive species have totally altered natural ecosystem structure and function and caused enormous economic damage. Zebra mussels have transformed the nature of freshwater ecosystems in the Great Lakes and surrounding rivers through their extraordinary filtration capacity. Invasive grasses are altering fire regimes and the nature of vegetation globally. With the zebra mussel, millions of dollars have been spent on controlling an organism that has only invaded during the past decade.

It appears that for certain systems the tempo of new invasions is increasing. Andrew Cohen and James Carlton have documented that the rate of new species introductions into the San Francisco Bay has increased from one new species every 55 weeks between 1851 and 1960 to one every 14 weeks since 1960. Further, all indications are that the problem will get worse as the pace of international commerce increases, habitats become more disturbed and dissected, and global warming takes hold.

There is an increasing political will to do something about the problem. The Convention on Biological Diversity contains an article that states that nations should, "prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species". The problem is that the issue is difficult and the tools we have to deal with it are limited at the moment. There may be no "recall" for many of the invasive species that now disrupt natural ecosystems. It is essential to apply the "precautionary principle" in addressing the introduction of new biotic material, as the capacity to predict which species will become invasive does not yet exist.

So what can policymakers, scientists and environmental activists do? We need to develop ecologically-sound control techniques to deal with invasives. We must stem the tide of introduced organisms in order for the problem to be addressed in a more orderly manner. Fostering a number of initiatives can help. First, we should give greater attention to the science of invasives, its predictive capacity, and particularly to the development of better biocontrol methods. We need to identify modern vectors of invasives and to close transport routes to inadvertent invaders, as is being attempted for ship ballast water, a major source of large numbers of marine invasives.

We must develop warning systems and make them available to resource managers, alerting them to problems from one region that have the potential of becoming a threat in their own. We need to examine inspection and quarantine systems to see what is working and what is not. Stopping invasives before entry is much less expensive than controlling them once they become established.

We should strengthen treaties relating to the transport of biological material and develop codes of conduct for the introduction of horticultural material and pets, so often the source of invasive organisms. Successful control techniques must be made available to managers through a readily-accessible data base.

Until there is evidence to the contrary, we should assume that any organism that is transported across borders has the potential to cause severe ecological damage. In that vein, we must develop new risk assessment techniques to deal with biological transport. Finally, we need to integrate economic and ecological approaches to analyzing the true cost of invasive species and of their control. If decisive action is not taken, David Quammen's recent prophesy will be fulfilled that the developing "Planet of Weeds will indeed be a crummier place, a lonelier and uglier place, and a particularly wretched place for the 2 billion absolute poor".

[*In the coming year, the CGBD will convene a funders forum to assist collaboration on this issue. Additionally, the Global Invasive Species Programme is an international effort to co-ordinate activities in this area. Programme information is available at http://www.lmcp.jussieu.fr/icsu/diversitas/. For an excellent summary of these issues see, Bright, C. 1998. Life Out of Bounds, W.W. Norton and Co.*]

CGBD MEMBER NEWS

The CGBD welcomes two new members, the Foundation for Deep Ecology and the Flintridge Foundation. Deep Ecology's grantmaking program is divided into three broad categories: wilderness, sustainable agriculture, and Megatechnology and Economic Globalization. Flintridge provides support to organizations whose work is dedicated to preserving and restoring native ecosystems in the Pacific Northwest. We look forward to continued work with John Davis and Brad Smith, particularly through the Forest Working Group.

As of January 1, Frank Tugwell left the Heinz Endowments to become President of Winrock International. Andrew McElwaine is leaving the Endowments to become President of the Pennsylvania Environmental Council. Melisa Crawford will be managing the environmental program, with assistance from Education Program Director, Joe Dominic.

Tom Bishop, trusty assistant to Peter Riggs and Michael Northrop at the Rockefeller Brothers Fund, has relocated with his family to Taipei. Tom's position has been taken by Ms. Lydia Brown.

Catherine Porter, the CGBD's Executive Director for the past six years, is moving along to other opportunities later this year. The Search Committee of the Board welcomes suggestions for her successor - call: 415-561-6575.

CGBD WORKING GROUP UPDATES

Forests

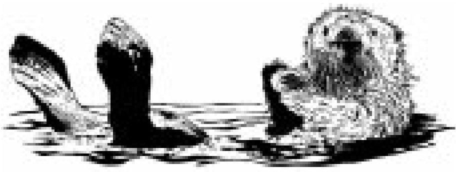
Members of the Sustainable Forestry/Certification sub-group continue to work on developing both the supply and demand for products derived from sustainably-managed forests. On January 25, the sub-group met in New York City, hearing presentations on the work of several organizations, including the Forest Stewardship Council, Smartwood and the Certified Forest Products Council, as well as discussing potential synergies between sustainable forestry and land trusts.

The Private Forests sub-group is putting the finishing touches on a consultancy to facilitate funder collaboration on U.S. private forest conservation. The consultant will summarize the state of U.S. privately-owned forests, identify threats to their continued existence and conservation, and discuss available tools to encourage conservation, and propose a grantmaking program to conserve privately-owned forest lands.

Several CGBD funders are interested in reinvigorating a Public Lands sub-group, to allow members to better communicate and collaborate in this area. These funders plan to meet soon by conference call to discuss areas of mutual interest and plot a strategy for future work by the group, including a potential meeting of the members in the Spring.

Marines

In December, the working group hosted a meeting in San Francisco on the development and management of marine protected areas (MPAs). The program focused on a series of case studies from Maine, Florida, Washington and California, highlighting regional distinctions in MPA development. It closed with a session on “lessons learned” and a roundtable discussion of “next steps” for funders.



Collaboration continues among members on implementation of the Magnuson-Stevens Fishery Conservation Act. Funder support is allowing the Marine Fish Conservation Network to provide critical input on fishery management plans developed under Act provisions. The work of regionally-based advocacy groups, supported by Marine Working Group members, was essential in assuring that management plans adequately addressed by-catch, overfishing and habitat conservation issues, as required in the Act.

Conservation & Development

The Conservation & Development Working Group will likely meet in late spring. The session will look at methods of monitoring and evaluating community-based efforts to conserve the environment while strengthening the community’s economic base.

Biodiversity & Environmental Health

The Working Group on Systemic Contaminants has changed its name. It is now the Working Group on Biodiversity and Environmental Health. While still primarily focused on persistent toxins as threats to biodiversity, the new title reflects the group’s intention to forge alliances with grantmakers who support other health issues: ecological, community and human. The threats to humans from toxic chemical exposures are every bit as great as those to wildlife. Political and media attention is more focused on human health issues than on wildlife, however — even though we know the current science is stronger with animal tests than human. Broadening the definition of Environmental Health should broaden access to the public and to other financial resources.

The new Conversion Foundations (healthcare companies set them up as they convert to for-profit institutions) are still a front-burner issue for this group: how to encourage their support of community environmental health in the communities they serve.

The group has a new topic under discussion as well: threats to human health from biological degradation, or ecological health and new diseases.

The working group continues its monthly conference calls, and will meet February 18 in Tempe, Arizona, where they sponsor a session on Environmental Health at the Grantmakers in Health annual meeting.

THE BIODIVERSITY PROJECT

The Biodiversity Project's new Strategy Team organized itself at a November 30-December 2 retreat in southwestern Wisconsin. In addition to providing critical strategic direction for the Project, the group articulated a mission statement, developed a simple "lay" description of biodiversity, and crafted a new over-arching biodiversity message. In the coming year, this group will continue to provide strategic direction for the Project, and will also serve as liaisons to the greater environmental community in building collaborative communications efforts.

Plans for the Tool Shed (cooperative clearinghouse of media and communications services) are well underway. The current plan is to incorporate the Tool Shed as a 501(c)(3) co-op. In the meantime, the Biodiversity Project and Environmental Media Services will serve as fiscal agents for the start-up work, which will include designing information systems, sorting out the thorny issues of copyrights for photos and video, and figuring out how to make media resources user-friendly via the web and other means.

The training initiative is also moving along. A draft set of principles and criteria for communications training are being fine tuned by a small committee for wider distribution. The criteria should provide a helpful tool for those who plan, provide and evaluate training. The group is also working to develop a "green paper" on capacity building and communications training, which will include some background on capacity building, success stories that document the effectiveness of good training, and other critical resources.

CALENDAR OF EVENTS

Mar. 15-16. Population Viability Analysis: Assessing Models for Recovering Endangered Species (San Diego, CA). Contact: Western Section of the Wildlife Society, (510)-465-4962 or <whull@cgbd.org>.

Mar. 20. 4th Annual International Wildlife Law Conference. (Washington D.C.). Contact: Wil Burns, (510) 540-0980 or JIWLP@earthling.net.

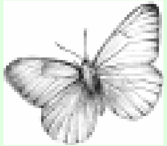
Mar. 26-30. 64th North American Wildlife and Natural Resources Conference (Burlingame, CA). Contact: Richard McCabe, (202) 371-1808.

May 7-9. Global Biodiversity Forum [GBF] (San Jose, Costa Rica). Contact: Nadene Canning Wacker,+(41)-22-999-00-01 or <GBF13@hq.iucn.org>.

May 13-14. 26th Annual Conference on Ecosystems Restoration and Creation (Tampa, FL). Contact: Frederick J. Webb, (813) 757-2104 or <webb@mail.hcc.cc.fl.us>.

June 14-16. CGBD Annual Meeting (Santa Fe, NM). Contact Alicia Ushijima, (415) 561-6575 or <cgbd@cgbd.org>.

HOT SPOTS ON THE WEB



Building upon the sobering lead article by Hal Mooney, the three featured websites in this issue of *Biodiversity Hotspots on the Web* focus on invasive species.

<*http://nas.er.usgs.gov/*> The United States Geological Survey's Nonindigenous Aquatic Species (NAS) website is a good place to look if you are searching for scientific reports, queries, contact lists or just general information on nonindigeous aquatic species. The website's primary geographical coverage is North America, but may cover other regions as the need arises.

<*http://www.cciw.ca/eman-temp/research/protocols/exotic/intro.html*> The Canada Centre for Inland Waters (CCIW) has an excellent guide to monitoring exotic and invasive plants. The guide gives a nice overview of invasive plants, as well as examples of projects that provide a basic framework for monitoring activities that can be modified to suit individual interests or needs.

<*http://www.nrfcg.gov/zebra.mussel/*> Another good USGS website gives information on the notorious zebra mussel. This web page is developed using suggestions and comments from website visitors. Visitor participation helps to provide needed information for the management and control of this high-profile invasive species.

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The CGBD now has its own website up and running. For general information and links to our members' websites visit us at <www.cgbd.org>.

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